IN THE CLAIMS:

The following listing replaces all prior versions of the claims.

1-9. (Cancelled)

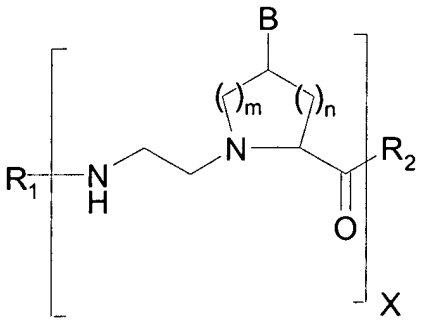
10. (Withdrawn) A method of using peptide nucleic acid oligomers as claimed in claim 9 for diagnosing and/or modulating the expression of genes in organisms.

11. (Withdrawn) A method as claimed claim 10 wherein said modulation includes inhibiting transcription and replication of the said gene.

12. (Withdrawn) A process for treating disease conditions associated with undesired protein production in an organsism by using the compound according to claims 1 and 2.

13. (Cancelled)

14. (New) A compound having the formula



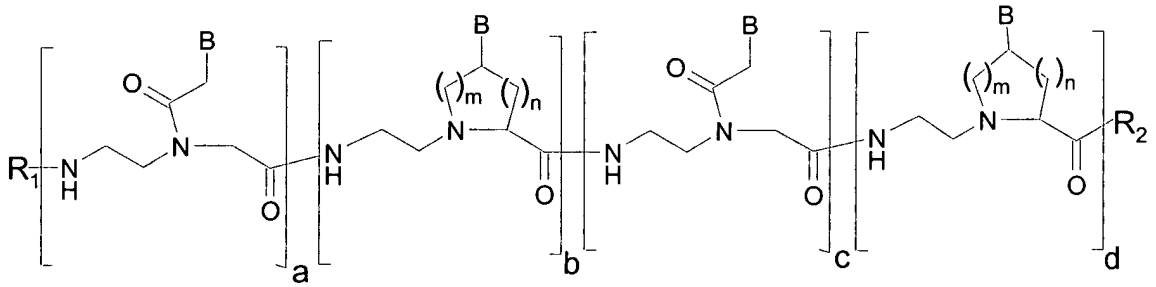
aep PNA II

wherein

- m and n are 1 to 2 and x = 1-20;

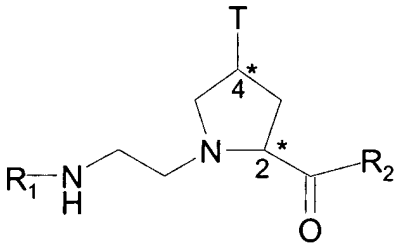
- each of B is independently selected from the group consisting of H, HO, NH_2, naturally occurring nucleobases adenine (A), thymine (T), cytosine (C) and guanine (G), non-naturally occurring nucleobases, DNA intercalators, heterocyclic moieties and reporter ligands;
- each chiral monomeric unit is independently selected from the four possible diastereomers; and
- R_1=H or Flurophore or Biotin, R_2=OH or $NH(CH_2)_2COOH$ or $NH(CH_2)_3NH(CH_2)_4NH(CH_2)_3NH_2$.

15. (New) A compound having the formula



aep PNA **III**

that is heteropolymeric aepPNA **III** comprising non-chiral *aeg* unit of aminoethylglycyl PNA **I** and chiral *aep* monomeric unit **IV**



IV

wherein

- each chiral monomer unit is independently selected from the four possible diastereomers;
- a, b, c, d, m, n are integers with independent values in the range 1 to10;
- R_1 is H, $COCH_3$ or L (L = dansyl, carboxyfluoresceinyl);

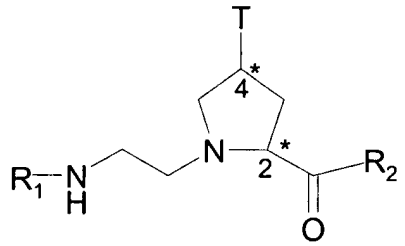
- R_2 is OH, NH_2, $NHCH_2CH_2COOH$, or $NH(CH_2)_3NH(CH_2)_4$ $NH(CH_2)_3NH_2$; and
- each of B is independently selected from the group consisting of H, HO, NH_2, naturally occurring nucleobases, non-naturally occurring nucleobases, DNA intercalators, heterocyclic moieties and reporter ligands.

16. (New) The compound as claimed in claim 15, wherein
    i) m=n=1, B=T, R_1=H, R_2= $NH(CH_2CH_2)COOH$, a=7, b=1, c=d=0;
    ii) m=n=1, B=T, R_1=H, R_2= $NH(CH_2CH_2)COOH$, a=c=3, b=d=1;
    iii) m=n=1, B=T, R_1=H, R_2= $NH(CH_2CH_2)COOH$, a=b=c=d=1, repeating twice in that order;
    iv) m=n=1, B=T, R_1=H, R_2= $NH(CH_2CH_2)COOH$, a=b=c=0, d=8; and
    v) m=n=1, B=T, R_1=H, R_2= $NH(CH_2CH_2)COOH$, a=d=0, b=1, c=7.

17. (New) The compound as claimed in claim 15, wherein oligomers are synthesized by adaptation of standard solution phase peptide synthesis procedures or standard solid phase peptide synthesis procedures.

18. (New) The compound as claimed in claim 16, wherein oligomers are synthesized by adaptation of standard solution phase peptide synthesis procedures or standard solid phase peptide synthesis procedures.

19. (New) A monomer precursor-synthon of formula **IV**



IV

wherein

- R_1=H, Boc or Fmoc:

- R_2 = OMe, H, OEt or OBenzyl;
- chirality at positions 2 and 4 results in four diastereomers (2*S*,4*R*), (2*R*,4*S*), (2*S*,4*S*) and (2*R*,4*R*); and
- T is a nucleobase.

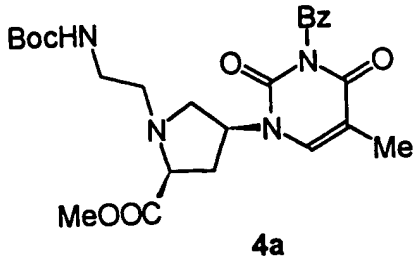
20. (New) The monomer precursor-synthon as claimed in claim 19 wherein T is a naturally occurring nucleobase.

21. (New) A process for preparing the compound of claim 19, comprising the steps of

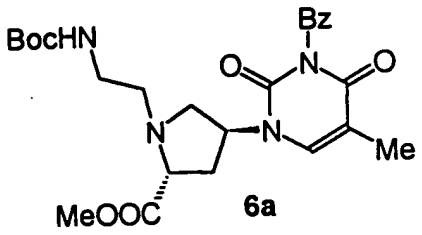
A. a) synthesizing (N-Boc)-2-aminoethanol from 2-aminoethanol;
b) synthesizing (N-Boc)-2-aminoethylbromide from (N-Boc)-2-aminoethanol;

B. N-alkylation of 4-hydroxyprolinemethylester with (N-Boc)-2-aminoethanol prepared as in step A;
(i) alkylation of 4*R*-hydroxy-2*S*-prolinemethylester with (N-Boc)-2-aminoethylbromide to obtain 1-(N-Boc-aminoethyl)-4*R*-hydroxy-2*S*-prolinemethyl ester;
(ii) alkylation of 4*R*-hydroxy-2*R*-prolinemethylester with (N-Boc)-2-aminoethyl bromide to obtain 1-(N-Boc-aminoethyl)-4*R*-hydroxy-2*R*-prolinemethyl ester;
(iii) alkylation of 4*S*-hydroxy-2*R*-prolinemethylester with (N-Boc)-2-aminoethyl bromide to obtain 1-(N-Boc-aminoethyl)-4*S*-hydroxy-2*R*-prolinemethylester;
(iv) alkylation of 4*S*-hydroxy-2*S*-prolinemethylester with (N-Boc)-2-aminoethyl bromide to obtain 1-(N-Boc-aminoethyl)-4*S*-hydroxy-2*S*-prolinemethylester;

C. Mitsunobu reaction of compounds 1-(N-Boc-aminoethyl)-4*R*-hydroxy-2*S*-prolinemethyl ester and (N-Boc)-2-aminoethanol prepared according to steps B(i) and B(ii) with N3-benzoylthymine, to produce monomer synthons of formulae 4a and **6a,** respectively

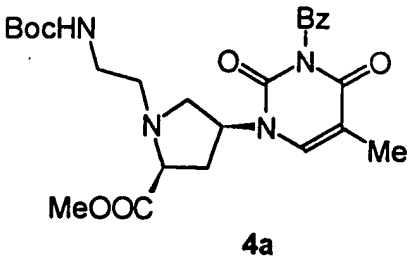


4a

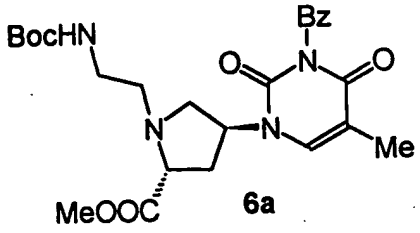


6a

22. A process for sequence specific recognition of a single or double stranded polynucleotide DNA or RNA by oligomers as in claim 14 using compounds of formulae 4a and 6a



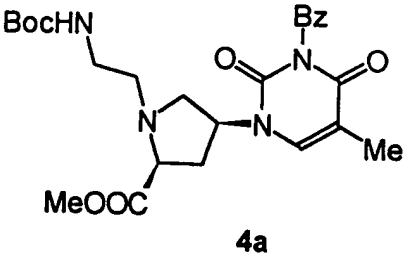
4a



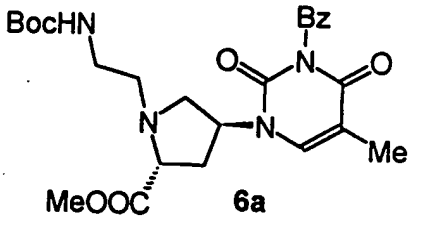
6a

according to claim 7.

23. A process for sequence specific recognition of a single or double stranded polynucleotide DNA or RNA by oligomers as in claim 15 using compounds of formulae 4a and 6a



4a



6a

according to claim 7.

24. A pharmaceutical composition comprising a compound according to claim 14, along with any other pharmaceutically effective agent.

25. A pharmaceutical composition comprising a compound according to claim 15, along with any other pharmaceutically effective agent.